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esp. nitenpyram, and a cyclodextrin cpd(s), partic. at ratios of about 5-95 wt.% and about 1-94 wt.%, respectively, partic. further contg. a water soluble weak basic substance.

USE/ADVANTAGE - Prevention and control of plant diseases and harmful insects. Stable granular prepns. of nitenpyram.

Nitenpyramis (E)-N-(6-chloro-3-pyridylmethyl)-N-ethyl-N'-methyl-2-nitrovinylidenediamine.

Conventional agricultural chemicals having water solubility of 0.01 pref. about 0.1 g/ml or over at 20 deg.C - 25 deg.C (eg. cartap, nitenpyram, allethrin, acephate,, oxydeprofos, vamidothion, trichlorfon, validamycin A, diquat and bialaphos) is mixed with a cyclodextrin cpd. (e.g. mono-, di- or tri-methyl)- (alpha, beta-, or gamma-)-cyclodextrin hydroxypropyl -(alpha-, beta-, or gamma)-cyclo-dextrin, glycosyl or gamma) cyclodextrin) at claimed ratios, together with the other water soluble weak basic substance, about 0.05-5 wt.% of a surfactant, about 0.01-0.5 wt.% of a pigment and about 0.5-10.0 wt.% of a binder) to give conventional granular prepns.

In an example, in 400 pts.wt. of water 10 pts. of nitenpyram, 30 pts. of a cyclodextrin mixt. and 60 pts. of NaOAc were dissolved and spray dried to give a granular compsn. The compsn. kept at 40 deg.C for 3 months showed residual rate of 99.1%.

Dwg.0/0

Derwent Class: C03
International Patent Class (Main): A01N-025/12
International Patent Class (Additional): A01N-025/22; A01N-043/40

13/34/11 DIALOG(R)File 351:Derwent WPI (c) 2004 Thomson Derwent. All rts. reserv.

004088403
WPI Acc No: 1984-233944/198438
Granular insecticide compsn. - contg. unsatd. or water-soluble polymer and dimethyl acetyl phosphoro amido thioate

Patent Assignee: HOKKO CHEM IND CO LTD (HOKK)
Number of Countries: 001 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
JP 59139306	A	19840810	JP 8312834	A	19830131	198438	B
JP 91023521	B	19910329	JP 8312834	A	19830131	199117	

Priority Applications (No Type Date): JP 8312834 A 19830131
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 59139306	A		8		

Abstract (Basic): JP 59139306 A

Granule contains O,S-dimethyl N-acetyl-phosphoro amidothioate as active component (1-10 wt.%), supported on mineral carrier. Wt. of each granule is adjusted to 0.1-5 g. Compsn. contains 1 or more cpd. selected from (a) water-soluble polymers and (b) unsatd. polymer resins.

Water-soluble polymer is e.g., potato starch, wheat starch, sodium arginate, gum arabic, gelatin, colagen, casein, methylcellulose, ethylcellulose, CMC, sodium polyacrylate, polyethyleneoxide, etc. Unsatd. polymer resin is e.g. EVA copolymer, ethylene-maleic acid copolymer, acrylic resin, methacrylic resin, PVAc, etc.

ADVANTAGE - The active component is known as acephate. Long-lasting effect can be obtd. by increasing the wt. of each granule

" to 10-1,000 times that of conventional acephate granule. Polymer controls the release of active component.

Derwent Class: A97; C01

International Patent Class (Additional): A01N-025/12; A01N-057/28

(19) Japan Patent Office (JP) (11) Patent Publication Number

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Hei 3- 23521

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Number of Invention 1 (Total 7 pages)

(54) Title of Invention: Insecticide in large granules for home gardening

Examination S62-3452 (21) Patent application No. S58-12834 (65) Application Publication No. S59-139306

(22) Filed on Showa 58 (1983) January 31 (48) Showa 59 (1984) August 10

(72) Inventor: Hajime Chiba 2-6-24 Tsujido Shinmachi, Fujusawa-shi, Kanagawa
(72) Inventor: Seiichi Maeda 4-2-21 Kyowa, Sagamihara-shi, Kanagawa
(72) Inventor: Shinji Yonemura Room 11-205 Okada-danchi, 1701-3 Okada, Atsugi-shi, Kanagawa
(72) Inventor: Kametarou Takeda 2-11-8 Nishimotomachi, Kokubunji-shi, Tokyo
(71) Applicant: Hokko Chemical Industry Co., Ltd.
4-20 Motoishi-machi 4-chome, Nihonbashi, Chuo-ku, Tokyo
Conference of Examiners: Chief Examiner, Yu Kaneya; Examiner, Akemi Hino and Examiner, Yoshitaka Hirabayashi

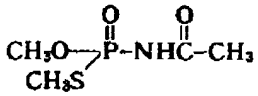
(56) Cited References: Unexamined Application Publication No. S50-100241 (JP, A)
Examined Patent Publication No. S52-48181 (JP, B2)
Examined Utility Model Publication No. S49-1533 (JP, Y1)

(57) What is claimed is:

1 An insecticide in large granules for home gardening, wherein a mineral carrier contains O,S-dimethyl N-acetyl phosphoroamido thioate as an insecticide ingredient in a range of 1 to 10% and is made into spherically shaped pieces each having a weight of 0.1g to 5g, whereas the insecticide in large granules contains at least one compound which is selected from (a) a water-soluble macromolecule compound, or (b) an unsaturated polymer resin.

Detailed Explanation of the Invention

The present invention pertains to providing a technology to improve a granulated acephate agent which is already widely used as an insecticide for home gardening. To be more specific, the present invention is related to an insecticide in large granules for home gardening, wherein a mineral carrier contains O,S-dimethyl N-acetyl phosphoroamido thioate (acephate), which is represented by the formula below, as an insecticide ingredient in a range of 1 to 10% and is made into spherically shaped pieces each having a weight of 0.1g to 5g, and preferably between 0.5g and 3g, whereas the insecticide in large granules contains at least one compound which is selected from (a) a water-soluble macromolecule compound, or (b) an unsaturated polymer resin in order to have lasting insect killing effects.

Acephate 

The purpose of the present invention is to provide a new insecticide in large granules for home gardening in which the granule weight is increased by 10 to 1000 fold of that of traditional granules of an acephate agent, thereby achieving a persistency of insect killing effects for a longer period of time without changing the quantity of an agent consumed per unit area.

In recent years, the number of people who engage in home gardening is rapidly increasing, however, in the current condition, unexpected accidents frequently occur due to insufficient knowledge on agricultural chemicals or unskillful methods in dealing with these chemicals among the fans of home gardening.

Examples of what is desired from an ideal agent type of an agricultural chemical for home gardening which is free from such accidents include (1) one which has a long persistence of effectiveness with fewer applications (for instance, once); (2) one which is easy to handle in an efficient manner, and (3) one which contains a small amount of agricultural chemical constituents and which poses small risk to users.

At present, generally a granulated agent is widely used as an insecticide for home gardening mainly because of the simplicity of its application method. However, the diameter of such a granulated agent is between 0.6mm and 1.2mm,

and the weight per granule is only 0.5mg to 10mg. Therefore in a case when such an agent is applied, the granules can immediately dissolve because of aspersion, rain water, and moisture in soil. Hence, such an agent exhibits fast-acting effects. On the other hand, effective constituents are gradually adsorbed on soil, or flow out and are lost, and thus the persistence of effectiveness declines drastically. As a result, such an agent type does not serve as an ideal one for an agricultural chemical for home gardening.

In addition, as a technique to complement the faults of such granulated agents, although the application is limited to paddy fields, a technology has been disclosed for large granules in which the weight per granule is between 0.6g and 30g and which contains 10 percent or more of a water-soluble rice insect prevention and elimination constituent (Patent Publication No. S52-48181).

However, these technologies, when applied to an insecticide for home gardening without any change, are not favorable in terms of the persistence of insect killing effects and chemical damage on useful plants. Furthermore, these technologies employ effective constituents at an extremely high concentration and hence, there is a disadvantage in that such insecticides are highly dangerous for household usage.

The inventors of the present invention were engaged in various studies in order to develop a new insecticide which can meet conditions (1) through (3) which, as mentioned above, are desired of an agricultural chemical for home gardening. As a result, the present inventors developed an insecticide in large granules for home gardening, wherein a mineral carrier contains acephate as an insecticide ingredient in a range of 1 to 10% and is made into spherically shaped pieces each having a weight of 0.1g to 5g, and preferably between 0.5g and 3g, whereas the insecticide in large granules contains at least one compound which is selected from (a) a water-soluble macromolecule compound, or (b) an unsaturated polymer resin in order to have lasting insect killing effects. When only one or a few pieces of this new granulated insecticide were applied to pots in which chrysanthemums or roses were planted, through the holes for planting cabbage, eggplant, and Chinese cabbage, and over the soil under cabbage, eggplant, and Chinese cabbage, the following benefits were observed in comparison to a prior art acephate granulated agent. In other words, as a result of the addition of a water-soluble macromolecule compound or an unsaturated polymer resin, the water solubility of acephate was adjusted and the quantity of elution into the moisture contained in soil was optimized, enabling the insect killing

effects of acephate to last longer than expected. In addition, compared to the prior art acephate granulated agents, the weight per granule was increased to 0.1g to 5g, which is 10 to 1000 times heavier, and at the same time the diameter of granules was also substantially increased. Therefore in a case when the insecticide is applied to the pots of chrysanthemums or roses, and through planting holes for planting cabbage, eggplant, and Chinese cabbage or under the plants of cabbage, eggplant, and Chinese cabbage, an even application can be achieved in a short period of time through spreading a certain number of pieces of the insecticide in a small area. Therefore it is not necessary to evenly distribute a large number of granules with smaller diameters over a large area. Thus, the efficiency is improved and the required labor is reduced. At the same time, the desired persistence of insect killing effects can be realized. Due to the fact that the quantity of contained effective constituents is as small as 10% or lower, there are benefits such as that users can avoid the risks at the time of application.

The inventors of the present invention created a new type of an acephate granulated agent as above, identified the new knowledge mentioned above which can not be observed in prior art acephate granulated agents and thereby completed the present invention.

The present invention can be explained in further detail as follows. First of all, in order to achieve the purpose of the present invention, it is necessary that the granulated agent is one which meets the conditions mentioned above. In a case when the weight per granule of the spherical pieces is set as heavy as 5g or more, the aspects of the labor reduction and the efficiency improvement which the present invention is aiming at can be expected to be realized. Nevertheless, because the pieces are large, they are more likely to be unevenly applied than an agent in smaller granules. Moreover, the size of the areas in which insect control effect is realized can be uneven, making insect control effects unstable. In addition, because a large quantity of an agent will be applied in one area, there are concerns regarding damages to crops depending on the type of crop and the timing of application. Therefore it is not favorable to set the weight per granule as 5g or more.

In addition, in a case when the weight per granule of spherical pieces is set to be 0.1g or less, the granules dissolve immediately after the application due to aspersion, rain water, and moisture contained in soil as in prior art granulated agents. As a result, even though such an agent exhibits fast-acting effects, persistency of the effects is substantially deteriorated, making it

impossible to achieve the desired purpose. Therefore reducing the weight per granule to 0.1g or less is not favorable.

Regarding the quantity of acephate to be contained in the spherical pieces of the present invention, a high concentration of acephate is avoided for the purpose of risk aversion for people who apply or handle the agent as an agricultural chemical for home gardening as mentioned above. Besides, the application method of the granulated agent pertaining to the present invention is a local application and hence, a localized application of a granulated agent with a high concentration may have the risk of causing damage on useful plants and so forth. Therefore, the concentration of acephate is set to be 10% or lower. Moreover, the concentration should be 1% or more, in consideration of the efficacy of the agent and economics of its production.

The examples of a water-soluble macromolecule compound and an unsaturated polymer resin which are applied in the present invention are as follows.

(1) Water-soluble macromolecule compounds

Natural compounds

(a) Starches: Potato starch, ocarina starch, wheat starch and so on

(b) Seaweeds: Sodium alginate, carrageenan and so on.

(c) Viscous plant substances: Guar gum, locust bean gum, arabia gum and so on.

(d) Viscous substances created by microorganisms: Xanthan gum and so on.

(e) Proteins: Gelatin, collagen, casein and so on.

Semi-synthetic compounds

(a) Cellulose related: Methyl cellulose, ethyl cellulose, carboxy methyl cellulose and so on.

(b) Starch related: Soluble starch, carboxy methyl starch and so on.

Synthetic compounds

Sodium polyacrylate, polyvinyl alcohol (PVA), polyethylene oxide and so on.

(2) Unsaturated polymer resins

(a) Ethylene copolymer related: Ethylene vinyl acetate copolymer, ethylene maleic acid copolymer and so on.

(b) Acrylic acid related: Acrylic resin, methacrylic resin and so on.

(c) Aceto-vinyl related: Poly vinyl acetate and so on

In terms of the quantity of these additive agents to be added into the spherical pieces of the present invention, in general cases approximately 0.1 to 10% is enough. However, preferably, the desired purpose can be achieved at approximately 0.5 to 5%.

Regarding the carrier which is used when manufacturing the insecticide in large granules for home gardening of the present invention, as long as it is an extender which is generally used for agricultural chemicals, no specific limitation is imposed. Examples of a carrier that can be employed include clay, talc, bentonite, diatom earth, calcium carbonate, calcium sulfate, attapulgite, acid clay, and zeeklite. Further, it is possible to add lignin sulfonate and so on as a binding agent to form a piece. In addition, a dissolution prevention agent may be added if necessary.

In addition, a surfactant can be mixed. Examples of interfacial active agents which can be employed include dodecyl hydrosulfate, dodecyl benzene sulfonate, butyl naphthalene sulfonate,

naphthalene sulfonate formalin condensated salt, dioctyl sulfosuccinate, polyoxyethylene alkyl ether, polyoxyethylene nonyl phenyl ether, polyoxyethylene styrenated phenyl ether, polyoxyethylene alkyl ether hydrosulfate, polyoxyethylene nonyl phenyl ether hydrosulfate and polyoxyethylene styrenated phenyl ether hydrosulfate. An arbitrary mixture of these agents can be utilized as well. Here, an alkyl group is saturated or unsaturated and has a carbon number of 8 to 20, and as for a salt, sodium, calcium, diethanolamine and ammonium are preferable.

In order to produce the insecticide in large granules for home gardening pertaining to the present invention, the methods and manufacturing machines which are ordinarily utilized by those who are in the industry will be employed. Among the examples are an inclined type 4 granule production machine, an extruding granule production machine, a rotating granule production machine, a tablet forming machine, and a pulverizing granule production machine. In a process of producing granules, it is also possible to shape an agent into spheres using a marumerizer.

In general a spherical shape is preferable, however, the spherical shape pertaining to the present invention means a sphere or a shape similar to a sphere, and does not have to be a perfect sphere (a ball). Therefore, tablet shape, oval shape, cube, and stick shape are also applicable.

In addition, other insecticides, bactericides, herbicides, plant growth regulating agents, nematode killing agents, tick killing agents, repellents, attractants, nutritional supplements that plants require in a small quantity, fertilizers and so forth can be mixed into the spherical pieces employed in the present invention and utilized.

What the insecticide in large granules for home gardening of the present invention can be applied to is the same as what acephate granulated agents which are already provided for a practical usage can be applied to. Typical examples are as follows.

Chrysanthemum and rose:	Antcow and thrips group
Cabbage and Chinese cabbage:	Bubworm, diamondback moth, cutworm, and antcow group
Eggplant and Cucumber:	Antcow group, thrips group, and green house whitefly

In addition, the application method of the insecticide in large granules of the present invention is as follows. In other words, when granules with a weight per piece of 2g containing 5% of acephate are taken as an example, in order to apply this agent at the time of planting a

crop, the agent should be applied at a ratio of one granule per plant in planting ditches or planting holes, and slightly mix the granules with soil. Then, a crop should be planted. Besides, in order to apply the agent during the growth period of a crop, the agent needs to be placed at the base of the plant at a ratio of one granule per plant. This ratio is converted to the quantity of an effective constituent per unit area of approximately 100mg per pot (approximately 254 cm^2). This quantity of an effective constituent can be increased or decreased appropriately in accordance with whether or not a plant is planted in a pot or what kind of crop is planted and so on. The percentage of acephate content, the weight per granule, and the number of pieces to be applied can be increased or decreased if necessary in response to how severer the parasite infestation is.

The insecticide in large granules for home gardening of the present invention which is produced as an agent in this manner can prolong the persistence period of effectiveness by two weeks or longer with the same quantity of an effective constituent per unit area than a prior art granulated acephate agent with a small granule diameter.

In order to explain the present invention in a concrete manner, some examples are described below. However, the present invention is not limited to these examples.

In addition, "parts" in the examples refer to parts by weight.

Example 1 (A water-soluble macromolecule compound was added.)

Clay was added to 10 parts of acephate, 5 parts of sodium lignin sulfonate and 5 parts of potato starch to obtain the total quantity of 100 parts. The mixture was mixed and crushed. Then an appropriate quantity of water was gradually added in a mist form to obtain spherical pieces using a rotating granule production machine. The pieces were dried and sifted to obtain an agent in spherical granules of the present invention, each of which had a weight of 0.1g.

Example 2 (A water-soluble macromolecule compound was added.)

Clay was added to 5 parts of acephate, 3 parts of sodium lignin sulfonate and 2 parts of methyl cellulose to obtain the total quantity of 100 parts. The mixture was mixed and crushed. Then an appropriate quantity of water was gradually added in a mist form using a rotating granule production machine to obtain spherical pieces. The pieces were dried and sifted to obtain an agent in spherical granules of the present invention, each of which had a weight of 2g.

Example 3 (A water-soluble macromolecule compound was added.)

Clay was added to 2 parts of acephate, 1 part of sodium lignin sulfonate, and 1 part of polyacrylic acid soda to obtain the total quantity of 100 parts. The mixture was mixed and crushed. Then an appropriate quantity of water was gradually added in a mist form to obtain spherical pieces using a rotating granule production machine. The pieces were dried and sifted to obtain an agent in spherical granules of the present invention, each of which had a weight of 5g.

Example 4 (A water-soluble macromolecule compound was added.)

Clay was added to 5 parts of acephate, 5 parts of wheat starch and 2 parts of sodium lignin sulfonate to obtain the total quantity of 100 parts. The mixture was mixed and crushed. Then pressure was applied to it in a tablet-shaping machine to obtain an agent in oval granules of the present invention, each of which had a weight of 1g.

Example 5 (An unsaturated polymer resin was added.)

Clay was added to 10 parts of acephate, 5 part of sodium lignin sulfonate and 2 parts of ethylene vinyl acetate copolymer to obtain the total quantity of 100 parts. The mixture was mixed and crushed. Then an appropriate quantity of water was gradually added in a mist form to obtain spherical pieces using a rotating granule production machine. The pieces were dried and sifted to obtain an agent in spherical granules of the present invention, each of which had a weight of 0.5g.

Example 6 (An unsaturated polymer resin was added.)

Clay was added to 5 parts of acephate, 2 part of sodium lignin sulfonate and 1 part of acrylic resin to obtain the total quantity of 100 parts. The mixture was mixed and crushed. Then an appropriate quantity of water was gradually added in a mist form to obtain spherical pieces using a rotating granule production machine. The pieces were dried and sifted to obtain an agent in spherical granules of the present invention, each of which had a weight of 1g.

Example 7 (An unsaturated polymer resin was added.)

Clay was added to 1 part of acephate, 1 part of sodium lignin sulfonate and 0.5 parts of poly vinyl acetate to obtain the total quantity of 100 parts. The mixture was mixed and crushed. Then an appropriate quantity of water was gradually added in a mist form to obtain spherical pieces using a rotating granule production machine. The pieces were dried and sifted to obtain an agent in spherical granules of the present invention, each of which had a weight of 5g.

Test Example Test of effectiveness persistence on rose green antcows

As the test method, a certain quantity of the test agents which were prepared in accordance with the examples was applied at the base of a rose (Type: Marina) which was planted in an unglazed pot with a diameter of 18cm (and a surface area of 254.3 cm^2). After the

application, at every certain number of days, 30 rose green antcows per plant were released, and the number of rose green antcows which survived as parasites after 24 hours was checked to measure the degree of insect prevention. The present test was carried out outdoors with 5 pots per plant per area. The test results are listed in Tables 1 and 2.

In addition, the degree of insect prevention (%) was obtained using the next formula.

$$\text{The degree of insect prevention (\%)} = \left(1 - \frac{Ta}{Ua}\right) \times 100$$

Ta: The total number of rose green antcows which survived as parasites 24 hours after they were released in an area where an agent was applied.

Ua: The total number of rose green antcows which survived as parasites 24 hours after they were released in an area where an agent was not applied.

Table 1 Results of effectiveness persistence test on rose green antcow

Test No.	Category	Additive	Quantity added (%)	Content of effective constituent (%)	Weight per spherical piece (g/granule)	Quantity applied (piece/pot)	Quantity of effective constituent per pot (mg/pot)	Degree of prevention (%)				
								1 day after application	2 days after application	5 days after application	21 days after application	35 days after application
1	The present invention	Potato starch	5	10	0.1	10	100	98	100	100	100	100
2	〃	〃	5	5	1	2	100	98	100	100	100	100
3	〃	〃	5	1	2	5	100	96	100	100	100	100
4	Comparative examnle	〃	5	0.5	20	1	100	42	58	88	100	65
5	〃	〃	5	1	10	1	100	41	56	82	100	60
6	〃	〃	5	10	0.05	20	100	96	100	100	49	0
7	The present invention	Methyl cellulose	2	5	2	1	100	99	100	100	100	100
8	〃	〃	2	5	0.5	4	100	96	100	100	100	100
9	Comparative examnle	〃	2	1	10	1	100	43	55	84	100	64
10	The present invention	Cyamoposis Gum	5	2.5	1	4	100	92	100	100	100	100
11	〃	〃	1	2.5	2	2	100	91	100	100	100	100
12	〃	Xanthan Gum	2	5	2	1	100	93	100	100	100	100
13	〃	〃	2	5	0.5	4	100	98	100	100	100	100
14	〃	Alginate sodium	5	5	2	1	100	92	100	100	100	100
15	〃	〃	5	1	5	2	100	95	100	100	100	100
16	〃	〃	1	2	1	5	100	95	100	100	100	100
17	〃	〃	1	10	1	1	100	97	100	100	100	100

18	Comparative example	"	1	1	10	1	100	42	53	85	100	63
19	The present invention	Carboxymethyl starch	1	2.5	1	4	100	98	100	100	100	100
20	"	"	1	2.5	2	2	100	96	100	100	100	100
21	"	"	1	2.5	1	4	100	98	100	100	100	100
22	Comparative example	"	1	1	10	1	100	40	58	89	100	65
23	The present invention	Polyacrylic acid sodium	3	2.5	2	2	100	96	100	100	100	100
24	"	"	1	2	1	5	100	95	100	100	100	100
25	"	"	1	2	1	5	100	98	100	100	100	100
26	"	Gelatin	2	5	2	1	100	95	100	100	100	100
27	"	"	2	5	1	2	100	94	100	100	100	100
28	The present invention	Polyvinyl alcohol	2.0	10	0.1	10	100	98	100	100	100	100
29	"	"	2.0	5	1	2	100	98	100	100	100	100
30	"	"	2.0	1	2	5	100	96	100	100	100	100

Test No.	Category	Additive	Quantity added (%)	Content of effective constituent (%)	Weight per spherical piece (g/granule)	Quantity applied (piece/pot)	Quantity of effective constituent per pot (mg/pot)	Degree of prevention (%)				
								1 day after application	2 days after application	5 days after application	21 days after application	35 days after application
31	Comparative example	〃	2.0	0.5	20	1	100	40	56	80	100	60
32	〃	〃	2.0	1	10	1	100	40	52	78	100	55
33	〃	〃	2.0	10	0.05	20	100	96	100	100	45	0
34	〃	Ethylene vinyl acetate copolymer	3	5	2	1	100	93	100	100	100	100
35	〃	〃	3	1	2	5	100	96	100	100	100	100
36	〃	〃	0.3	1	2	5	100	94	100	100	100	100
37	〃	〃	0.3	1	5	2	100	95	100	100	100	100
38	Comparative example	〃	0.3	1	10	1	100	40	58	89	100	70
39	The present invention	Acrylic resin	1	2	2.5	2	100	95	100	100	100	100
40	〃	〃	1	10	1	1	100	94	100	100	100	100
41	〃	〃	1	10	0.5	2	100	94	100	100	100	100
42	〃	〃	0.1	5	1	2	100	93	100	100	100	100
43	Comparative example	〃	0.1	5	0.05	40	100	93	100	100	51	0
44	〃	〃	0.1	1	10	1	100	42	58	88	100	65

45	The present invention	Poly vinyl acetate	2	2	1	5	100	98	100	100	100	100
46	"	"	0.5	1	5	2	100	96	100	100	100	100
47	"	"	0.5	1	1	10	100	98	100	100	100	100
48	Comparative examnle	"	0.5	1	10	1	100	45	59	87	100	66
49	"	"	0.5	0.5	20	1	100	42	58	86	100	65
50	"	Additive free	0	0.5	20	1	100	33	48	73	100	60
51	"	"	0	0.5	10	2	100	32	48	72	100	62
52	"	"	0	1	10	1	100	34	47	73	100	61
53	"	"	0	2	5	1	100	58	89	100	63	0
54	"	"	0	1	5	2	100	57	86	100	62	0
55	"	"	0	1	2	5	100	96	100	100	63	0
56	"	"	0	2.5	2	2	100	92	100	100	62	0
57	"	"	0	5	2	1	100	91	100	100	61	0
58	"	"	0	1	1	10	100	98	100	100	58	0
59	"	"	0	2	1	5	100	97	100	100	59	0
60	"	"	0	5	1	2	100	96	100	100	57	0
61	"	"	0	10	1	1	100	94	100	100	58	0
62	"	"	0	5	0.5	4	100	96	100	100	53	0

Test No.	Category	Additive	Quantity added (%)	Content of effective constituent (%)	Weight per spherical piece (g/granule)	Quantity applied (piece/pot)	Quantity of effective constituent per pot (mg/pot)	Degree of prevention (%)				
								1 day after application	2 days after application	5 days after application	21 days after application	35 days after application
63	〃	〃	0	10	0.5	2	100	94	100	100	54	0
64	〃	〃	0	10	0.1	10	100	96	100	100	50	0
65	〃	〃	0	10	0.05	40	100	93	100	100	40	0
66	〃	〃	0	5	0.001	1000	100	95	100	100	35	0

Note 1) In the tables No. 1-No. 33: water-soluble macromolecule compound

No. 34-No. 49: unsaturated polymer resin

Note 2) The comparative examples were fabricated and tested in accordance with the examples of the present invention.

Table 2 Results of the effectiveness persistence test on rose green antcow depending on the difference in granule shape of agents of the present invention

Test No.	Category	Additive	Quantity added (%)	Shape	Content of effective component (%)	Weight per spherical piece (g/grain)	Quantity applied (piece/pot)	Quantity of effective component per a pot (mg/pot)	Degree of Prevention (%)				
									1 day after application	2 days after application	5 days after application	21 days after application	35 days after application
67	The present invention	Potato starch	5	Spherical shape	5	1	2	100	98	100	100	100	100
68	〃	〃	5	Oval	5	1	2	100	97	100	100	100	100
69	〃	〃	5	Pellet	5	1	2	100	96	100	100	100	100
70	〃	Wheat starch	5	Tablet	5	1	2	100	97	100	100	100	100

No difference was observed in efficiency based on the difference in shape of the granules of the agents of the present invention such as a spherical shape, oval shape, and pellet.